

Appl. No. 10/071,968
Amdt dated October 20, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-16 (canceled).

17 (currently amended): ~~The device of Claim 14 wherein:~~ A device comprising:
a component;

a heat sink attached to the component, the heat sink having at least one cutout and having an overhang on all sides of the component; and

a clip in contact with the component and the heat sink, the clip having a polygonal frame and a portion that extends through the at least one cutout, the portion of the clip attaching the component to the heat sink;

wherein:

the component has four sides;

the polygonal frame also four sides; and

each side of the polygonal frame is substantially parallel to a corresponding side of the component.

18 (currently amended): ~~The device of Claim 14 wherein:~~ A device comprising:
a component;

a heat sink attached to the component, the heat sink having at least one cutout and having an overhang on all sides of the component; and

a clip in contact with the component and the heat sink, the clip having a polygonal frame and a portion that extends through the at least one cutout, the portion of the clip attaching the component to the heat sink;

wherein:

the heat sink has a lower surface attached to the component;

the heat sink has an upper surface opposite to the lower surface; and

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Appl. No. 10/071,968
Amdt dated October 20, 2003

the heat sink comprises a plurality of protrusions located on the upper surface.

19 (previously presented): The device of Claim 18 wherein:
a group of said protrusions are located in a central region of the upper surface of
the heat sink;

the remainder of said protrusions are located in an outer region of the heat sink that
is separated from the central region by an inner region of the heat sink; and
the inner region of the heat sink is devoid of protrusions.

20 (previously presented): The device of Claim 19 wherein:
the polygonal frame of the clip has a lower surface in contact with the upper surface
of the heat sink in the inner region.

21 (previously presented): The device of Claim 19 wherein:
the polygonal frame has four sides;
the inner region of the heat sink also has four sides; and
each side of the polygonal frame is in contact with a corresponding side of the inner
region.

22 (previously presented): The device of Claim 21 wherein:
the polygonal frame has an upper surface opposite to the lower surface of the
polygonal frame; and
a thickness of the polygonal frame between the upper surface and the lower surface
thereof is smaller than a height of a protrusion in said plurality of protrusions.

23 (previously presented): The device of Claim 19 wherein:
said "at least one cutout" is a round hole located in the inner region of the heat sink;
and
the clip has a rod with a round cross section that passes through the round hole.

24 (previously presented): The device of Claim 23 wherein:

Appl. No. 10/071,968
Amdt dated October 20, 2003

the heat sink has a plurality of additional holes also located in the inner region; and
the clip has a plurality of additional members that pass through the additional holes
in the heat sink.

25 (previously presented): The device of Claim 19 wherein:
among the remainder of said protrusions located in the outer region of the heat sink,
there are at least two rows on at least one side of the heat sink.

26 (previously presented): The device of Claim 25 wherein:
there are at least two rows on all sides of the heat sink, including said at least one
side.

27 (previously presented): The device of Claim 25 wherein:
at least one of the protrusions in the at least two rows is a cooling fin.

28 (previously presented): The device of Claim 25 wherein:
at least one of the protrusions in the at least two rows is a cooling pin.

29 (previously presented): The device of Claim 18 wherein:
the polygonal frame of the clip has an upper surface that is exposed;
the polygonal frame has a lower surface that is opposite to the exposed upper
surface;

the lower surface of the polygonal frame is in contact with a first region on the upper
surface of the heat sink;

the polygonal frame surrounds a group of said protrusions located in a central
region of the upper surface of the heat sink; and

the component has an upper surface that is attached to a central region of a lower
surface of the heat sink

30 (canceled).

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Appl. No. 10/071,968
Amdt dated October 20, 2003

31 (previously presented): A device comprising:
a component;
a heat sink attached to the component, the heat sink having an overhang on all sides of the component, the heat sink comprising a plurality of protrusions located on an upper surface thereof; and
a clip in contact with the component and the heat sink, the clip having a portion that extends through an opening in the heat sink, the portion of the clip attaching a lower surface of the heat sink to the component;
wherein the lower surface of the heat sink is separated from the upper surface of the heat sink by a distance equal to the thickness of the heat sink;
the device further comprising:
a group of said protrusions are located in a central region of the upper surface of the heat sink;
the remainder of said protrusions are located in an outer region of the heat sink that is separated from the central region by an inner region of the heat sink;
the inner region of the heat sink is devoid of protrusions; and
the clip rests in the inner region and surrounds the group of said protrusions located in the central region of the heat sink.

32 (previously presented): The device of Claim 31 wherein:
among the remainder of said protrusions located in the outer region of the heat sink, there are at least two rows on at least one side of the heat sink, and at least one of the protrusions is either a cooling fin or a cooling pin.

33 (previously presented): A device comprising:
a component;
a heat sink attached to the component, the heat sink having an overhang on all sides of the component, the heat sink comprising a plurality of protrusions located on an upper surface thereof; and

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Appl. No. 10/071,968
Amdt dated October 20, 2003

a clip in contact with the component and the heat sink, the clip having a portion that extends through an opening in the heat sink, the portion of the clip attaching a lower surface of the heat sink to the component;

wherein the lower surface of the heat sink is separated from the upper surface of the heat sink by a distance equal to the thickness of the heat sink;

the device further comprising:

said opening is a round hole located in a region of the heat sink free of said protrusions; and

the clip has a rod with a round cross section that passes through the round hole.

34 (previously presented): The device of Claim 33 wherein:

the heat sink has a plurality of additional holes also located in said region; and

the clip has a plurality of additional members that pass through the additional holes in the heat sink.

35 (previously presented): A device comprising:

a component;

a heat sink attached to the component, the heat sink having at least one feature selected from a group consisting of opening and cutout and having an overhang on all sides of the component, the heat sink comprising a group of protrusions located in a central region of the heat sink; and

a clip comprising a polygonal frame that surrounds the group of protrusions on all sides, the clip further comprising a portion that extends through the feature in the heat sink, the portion of the clip attaching the component to the heat sink.

36 (previously presented): The device of Claim 35 wherein:

additional protrusions are located in an outer region of the heat sink separated from said group of protrusions by an inner region of the heat sink; and

the inner annular region of the heat sink is devoid of protrusions.

37 (previously presented): The device of Claim 36 wherein:

Appl. No. 10/071,968
Amdt dated October 20, 2003

the polygonal frame of the clip has a lower surface in contact with the upper surface of the heat sink in the inner region.

38 (previously presented): The device of Claim 36 wherein:
the polygonal frame has four sides;
the inner region of the heat sink also has four sides; and
each side of the polygonal frame is in contact with a corresponding side of the inner region.

39 (previously presented): The device of Claim 38 wherein:
the polygonal frame has an upper surface opposite to the lower surface of the polygonal frame; and
a thickness of the polygonal frame between the upper surface and the lower surface thereof is smaller than a height of a protrusion.

40 (previously presented): The device of Claim 36 wherein:
said feature is a round hole located in the inner region of the heat sink; and
the clip has a rod with a round cross section that passes through the round hole.

41 (previously presented): The device of Claim 40 wherein:
the heat sink has a plurality of additional holes also located in the inner region; and
the clip has a plurality of additional members that pass through the additional holes in the heat sink.

42 (previously presented): The device of Claim 36 wherein:
the additional protrusions form two rows on all sides of the heat sink, and each protrusion is either a fin or a pin.

43 (previously presented): The device of Claim 35 wherein:
the polygonal frame of the clip has an upper surface that is exposed;

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Appl. No. 10/071,968
Amdt dated October 20, 2003

the polygonal frame has a lower surface that is opposite to the exposed upper surface;

the lower surface of the polygonal frame is in contact with a first region on the upper surface of the heat sink; and

the component has an upper surface that is attached to a central region of a lower surface of the heat sink.

44 (previously presented): A device comprising:

a component;

a heat sink attached to the component, the heat sink having at least one opening and having an overhang on all sides of the component;

a clip having a portion that extends through the opening in the heat sink, the portion of the clip attaching the heat sink to the component;

wherein

the heat sink has at least a group of protrusions, the group being surrounded on all sides by the clip; and

the heat sink has additional protrusions that together surround the clip.

45 (previously presented): The device of Claim 44 wherein:

the additional protrusions form two rows on all sides of the heat sink, and each protrusion is either a fin or a pin.

46 (previously presented): The device of Claim 44 wherein:

the heat sink has a plurality of additional holes located between the group of protrusions and the additional protrusions; and

the clip has a plurality of additional members that pass through the additional holes in the heat sink.

47 (previously presented): The device of Claim 19 wherein:

the inner region is rectangular.

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Appl. No. 10/071,968
Amdt dated October 20, 2003

48 (previously presented): The device of Claim 29 wherein:
the first region is rectangular.

49 (currently amended): The device of Claim ~~[[30]]~~ 31 wherein:
the inner region is rectangular.

50 (previously presented): The device of Claim 33 wherein:
the inner region is rectangular.

51 (previously presented): The device of Claim 36 wherein:
the inner region is rectangular.

52 (previously presented): The device of Claim 44 wherein:
the clip comprises a rectangular frame.

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